

THAT WHICH IS CLAIMED IS:

1. An apparatus for treating pollutants in a gas and comprising:

a gas flow tube carrying a flow of gas to be treated and comprising a sidewall having an opening
5 therein;

a source of hydrogen peroxide;

a treatment injector connected to the opening in the sidewall of said gas flow tube for creating and injecting dissociated hydrogen peroxide into the flow
10 of gas to be treated, said treatment injector comprising

an injector housing having an inlet, an outlet and a hollow interior extending therebetween, the inlet being connected in fluid
15 communication with said source of hydrogen peroxide so that hydrogen peroxide flows through the hollow interior and toward the outlet, and
at least one ultraviolet (UV) lamp positioned within the hollow interior of said
20 injector housing for dissociating hydrogen peroxide flowing therethrough so that the dissociated hydrogen peroxide is injected into the flow of gas from the outlet for treating pollutants.

2. An apparatus according to Claim 1 wherein the pollutants include nitrogen oxides; and further comprising a scrubber connected to said gas flow tube downstream from said treatment injector for
5 removing reaction products of nitrogen oxides with the dissociated hydrogen peroxide.

3. An apparatus according to Claim 1 further comprising an air source connected in fluid communication with the inlet of said injector housing.

4. An apparatus according to Claim 1 further comprising a heater carried by said injector

housing.

5. An apparatus according to Claim 1 wherein the outlet is connected in fluid communication with the opening in the sidewall of said gas flow tube.

6. An apparatus according to Claim 1 wherein said injector housing extends through the opening in the sidewall of said gas flow tube.

7. An apparatus according to Claim 1 wherein said injector housing has a generally tubular shape.

8. An apparatus according to Claim 7 wherein said at least one UV lamp has an elongate shape and is oriented generally parallel to the tubular shape of said injector housing.

9. An apparatus according to Claim 7 wherein said at least one UV lamp has an elongate shape and is oriented transverse to the tubular shape of said injector housing.

10. An apparatus according to Claim 1 further comprising a UV reflective coating on an interior of said injector housing.

11. An apparatus according to Claim 1 further comprising a boric acid coating on an interior of said injector housing.

12. An apparatus according to Claim 1 further comprising at least one cooling fan associated with said at least one UV lamp.

13. An apparatus according to Claim 1 wherein the flow of gas to be treated comprises flue gas.

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14. An apparatus according to Claim 1 wherein the flow of gas to be treated is from a stationary source.

15. An apparatus for treating pollutants in a flue gas from a stationary source and comprising:

a gas flow tube carrying a flow of flue gas from the stationary source and comprising a sidewall
5 having an opening therein;

a source of hydrogen peroxide;

a treatment injector for creating and injecting dissociated hydrogen peroxide into the flow of flue gas from the stationary source, said treatment
10 injector comprising

an injector housing external to said gas flow tube and having an inlet, an outlet and a hollow interior extending
15 therebetween, the inlet being connected in fluid communication with said source of hydrogen peroxide and the outlet being connected in fluid communication with the opening in the sidewall of said gas flow tube
20 so that hydrogen peroxide flows through the hollow interior and toward the outlet,

at least one ultraviolet (UV) lamp positioned within the hollow interior of said
25 injector housing for dissociating hydrogen peroxide flowing therethrough so that the dissociated hydrogen peroxide is injected into the flow of gas from the outlet for treating pollutants; and
30 a scrubber connected to said gas flow

tube downstream from said treatment injector for removing reaction products of pollutants with the dissociated hydrogen

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35 peroxide.

16. An apparatus according to Claim 15 further comprising an air source connected in fluid communication with the inlet of said injector housing.

17. An apparatus according to Claim 15 further comprising a heater carried by said housing.

18. An apparatus according to Claim 15 wherein said injector housing has a generally tubular shape.

19. An apparatus according to Claim 18 wherein said at least one UV lamp has an elongate shape and is oriented generally parallel to the tubular shape of said injector housing.

20. An apparatus according to Claim 18 wherein said at least one UV lamp has an elongate shape and is oriented transverse to the tubular shape of said injector housing.

21. An apparatus for treating pollutants in a flue gas from a stationary source and comprising:
a gas flow tube carrying a flow of flue gas from the stationary source and comprising a sidewall
5 having an opening therein;
a source of hydrogen peroxide;
a treatment injector for creating and injecting dissociated hydrogen peroxide into the flow of flue gas from the stationary source, said treatment
10 injector comprising:

an injector housing extending through the opening in the sidewall of said gas flow tube, said injector housing having
15 an inlet, an outlet and a hollow interior extending therebetween, the inlet being

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connected in fluid communication with said
source of hydrogen peroxide so that hydrogen
peroxide flows through the hollow interior
and toward the outlet,

at least one ultraviolet (UV) lamp
positioned within the hollow interior of said
injector housing for dissociating hydrogen
peroxide flowing therethrough so that the
dissociated hydrogen peroxide is injected
into the flow of gas from the outlet for
treating pollutants; and
a scrubber connected to said gas flow

tube downstream from said treatment
injector for removing reaction products of
the pollutants with the dissociated hydrogen
peroxide.

22. An apparatus according to Claim 21
further comprising an air source connected in fluid
communication with the inlet of said injector housing.

23. An apparatus according to Claim 21
further comprising a heater carried by said housing.

24. An apparatus according to Claim 21
wherein said injector housing has a generally tubular
shape.

25. An apparatus according to Claim 24
wherein said at least one UV lamp has an elongate shape
and is oriented generally parallel to the tubular shape
of said injector housing.

26. An apparatus according to Claim 24
wherein said at least one UV lamp has an elongate shape
and is oriented transverse to the tubular shape of said

injector housing.

27. A treatment injector for cooperating with a source of hydrogen peroxide for creating and injecting dissociated hydrogen peroxide into flow of gas having pollutants, the treatment injector
5 comprising:

an injector housing having an inlet, an outlet and a hollow interior extending therebetween, the inlet being connected in fluid communication with the source of hydrogen peroxide so that hydrogen
10 peroxide flows through the hollow interior and toward the outlet; and

at least one ultraviolet (UV) lamp positioned within the hollow interior of said injector housing for dissociating hydrogen peroxide flowing therethrough so
15 that the dissociated hydrogen peroxide is injected into the flow of gas from the outlet.

28. A treatment injector according to Claim 27 further comprising an air source connected in fluid communication with the inlet of said injector housing.

29. A treatment injector according to Claim 27 further comprising a heater carried by said housing.

30. A treatment injector according to Claim 27 wherein said injector housing has a generally tubular shape.

31. A treatment injector according to Claim 30 wherein said at least one UV lamp has an elongate shape and is oriented generally parallel to the tubular shape of said injector housing.

32. A treatment injector according to Claim 30 wherein said at least one UV lamp has an elongate shape and is oriented transverse to the tubular shape of said injector housing.

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33. A treatment injector according to Claim 27 further comprising a UV reflective coating on an interior of said injector housing.

34. A treatment injector according to Claim 27 further comprising a boric acid coating on an interior of said injector housing.

35. A treatment injector according to Claim 27 further comprising at least one cooling fan associated with said at least one UV lamp.

36. A method for treating pollutants in a flow of gas carried by a gas flow tube using a hydrogen peroxide source, the method comprising:

coupling a treatment injector between the
5 hydrogen peroxide source and the gas flow tube, the treatment injector comprising an injector housing having an inlet, an outlet and a hollow interior extending therebetween, the inlet being connected in fluid communication with the source of hydrogen
10 peroxide, the treatment injector further comprising at least one ultraviolet (UV) lamp positioned within the hollow interior of the injector housing; and

flowing hydrogen peroxide through the hollow interior of the injector housing and toward the outlet
15 while operating the at least one UV lamp to dissociate hydrogen peroxide so that dissociated hydrogen peroxide is injected into the flow of gas from the outlet for treating pollutants in the flow of gas.

37. A method according to Claim 36 further comprising scrubbing reaction products of pollutants with the dissociated hydrogen peroxide from the flow of gas downstream from the treatment injector.

38. A method according to Claim 36 further comprising delivering a flow of air to the inlet of the

injector housing.

39. A method according to Claim 36 further comprising heating hydrogen peroxide within the injector housing.

40. A method according to Claim 36 wherein the flow of gas comprises flue gas.

41. A method according to Claim 36 wherein the flow of gas is from a stationary source.

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